

LISTING OF CLAIMS

1-135. (Cancelled)

136. (Currently Amended) ~~The~~ A method of making an ophthalmic element comprising forming an at least partial coating adapted to polarize at least transmitted radiation on at least a portion of at least one exterior surface of the ophthalmic element, claim 117 wherein forming the at least partial coating adapted to polarize at least transmitted radiation comprises:

forming a first at least partial coating comprising an alignment medium on the at least a portion of at least one exterior surface of the ophthalmic element and at least partially ordering at least a portion of the alignment medium;  
forming a second at least partial coating comprising an alignment transfer material on at least a portion of the first at least partial coating and at least partially aligning at least a portion of the alignment transfer material; and  
forming a third at least partial coating comprising at least one anisotropic material and at least one dichroic material on at least a portion of the second at least partial coating and at least partially aligning at least a portion of the at least one dichroic material.

137. (Original) The method of claim 136 further comprising at least partially setting at least a portion of the first at least partial coating prior to forming the second at least partial coating.

138. (Original) The method of claim 136 further comprising at least partially setting at least a portion of the second at least partial coating after aligning at least a portion of the alignment transfer material.

139. (Original) The method of claim 136 further comprising at least partially setting at least a portion of the third at least partial coating after aligning at least a portion of the at least one dichroic material.

140. (Cancelled)

141. (Currently Amended) ~~The A method of claim 140 of making an ophthalmic element comprising:~~

imparting at least one orientation facility on at least a portion of at least one exterior surface of an ophthalmic element, wherein imparting the at least one orientation facility on the at least a portion of the at least one exterior surface of the ophthalmic element comprises at least one of: applying an at least partial coating comprising an alignment medium to the at least a portion of the at least one exterior surface of the ophthalmic element and at least partially ordering at least a portion of the alignment medium; ~~and~~ applying an at least partially stretched polymer sheet to the at least a portion of the at least one exterior surface of the ophthalmic element; ~~and at least partially treating at least a portion of the at least one exterior surface of the ophthalmic element~~

subsequently forming an at least partial coating adapted to polarize at least transmitted radiation on at least a portion of the at least one orientation facility.

142-163. (Cancelled)

164. (Currently Amended) ~~The A method of claim 157 making an ophthalmic element comprising:~~

applying an at least partial coating to at least a portion of at least one exterior surface of the ophthalmic element, wherein applying the at least partial coating to the at least a portion of at least one exterior surface of the ophthalmic element comprises applying an at least partial coating comprising an alignment medium to the at least a portion of the at least one exterior surface of the ophthalmic element; and adapting at least a portion of the at least partial coating to polarize at least transmitted radiation, wherein adapting at least a portion of the at least partial coating to polarize at least transmitted radiation comprises:

at least partially ordering at least a portion of the alignment medium,  
applying at least one dichroic material to at least a portion of the at least partial coating comprising the alignment medium, and  
at least partially aligning at least a portion of the at least one dichroic material.

165. (Original) The method of claim 164 wherein the alignment medium is chosen from photo-orientation materials, rubbed-orientation materials, and liquid crystal materials.

166. (Original) The method of claim 165 wherein the photo-orientation materials are photo-orientable polymer networks chosen from azobenzene derivatives, cinnamic acid derivatives, coumarine derivatives, ferulic acid derivatives, and polyimides.

167. (Currently Amended) The method of claim 164 wherein at least partially ordering the at least a portion of the alignment medium comprises at least one of exposing at least a portion of the alignment medium to plane-polarized ultraviolet radiation, exposing the at least a portion of the alignment medium to an electric field, exposing the at least a portion of the alignment medium to a magnetic field, exposing the at least a portion of the alignment medium to infrared radiation, drying the at least a portion of the alignment medium; etching the at least a portion of the alignment medium[[s]]; exposing the at least a portion of the alignment medium to a shear force; and rubbing the at least a portion of the alignment medium.

168. (Original) The method of claim 164 further comprising at least partially setting at least a portion of the at least partial coating comprising the alignment medium prior to applying the at least one dichroic material.

169. (Original) The method of claim 164 wherein applying the at least one dichroic material and at least partially aligning at least a portion of the at least one dichroic material occur at essentially the same time.

170. (Original) The method of claim 164 wherein applying the at least one dichroic material occurs prior to at least partially aligning at least a portion of the at least one dichroic material.

171. (Original) The method of claim 164 wherein applying the at least one dichroic material occurs after at least partially aligning at least a portion of the at least one dichroic material.

172. (Original) The method of claim 164 wherein applying the at least one dichroic material to the at least a portion of the at least partial coating comprising the alignment medium comprises at least one of spin coating, spray coating, spray and spin coating, curtain coating,

flow coating, dip coating, injection molding, casting, roll coating, wire coating, overlaying, and imbibing.

173. (Currently Amended) The method of claim 164 wherein applying the at least one dichroic material to the at least a portion of the at least partial coating comprising the alignment medium comprises applying an at least partial coating comprising at least one anisotropic material and the at least one dichroic material to the portion of the at least partial coating comprising the alignment medium.

174. (Original) The method of claim 173 wherein at least partially aligning at least a portion of the at least one dichroic material comprises at least partially aligning at least a portion of the at least one anisotropic material such that the at least a portion of the dichroic material is at least partially aligned with the at least partially aligned anisotropic material.

175. (Original) The method of claim 173 further comprising at least a partially setting at least a portion of the at least one anisotropic material.

176-194. (Cancelled)

195. (NEW) The method of claim 136 wherein the alignment medium is at least one of a photo-orientation material, a rubbed-orientation material, and a liquid crystal material.

196. (NEW) The method of claim 195 wherein the liquid crystal material is at least one of a thermotropic liquid crystal polymer, a thermotropic liquid crystal pre-polymer, and a thermotropic liquid crystal monomer.

197. (NEW) The method of claim 195 wherein the photo-orientation material is at least one of an azobenzene derivative, a cinnamic acid derivative, a coumarine derivative, a ferulic acid derivative, and a polyimide.

198. (NEW) The method of claim 195 wherein the rubbed-orientation material is at least one of a (poly)imide, a (poly)siloxane, a (poly)acrylate, and a (poly)coumarine.

199. (NEW) The method of claim 136 wherein the first at least partial coating comprising the alignment medium has a thickness ranging from of at least 5 nanometers to 1000 nanometers.

200. (NEW) The method of claim 136 wherein the first at least partial coating comprising the alignment medium further comprises at least one of a dichroic material, a photochromic material, a dye, an alignment promoter, a kinetic enhancing additive, a photoinitiator, a solvent, a light stabilizer, a heat stabilizer, a mold release agent, a rheology control agent, a leveling agent, a free radical scavenger, and an adhesion promoter.

201. (NEW) The method of claim 136 wherein the alignment transfer material is at least one of a thermotropic liquid crystal polymer, a thermotropic liquid crystal pre-polymer, and a thermotropic liquid crystal monomer.

202. (NEW) The method of claim 201 wherein the liquid crystal material is a cross-linkable liquid crystal material.

203. (NEW) The method of claim 202 wherein the liquid crystal material is a photocross-linkable liquid crystal material.

204. (NEW) The method of claim 136 wherein the alignment transfer material is a liquid crystal material having at least one functional group chosen from acrylates, methacrylates, allyl, allyl ethers, alkynes, amino, anhydrides, epoxides, hydroxides, isocyanates, blocked isocyanates, siloxanes, thiocyanates, thiols, urea, vinyl, and vinyl ethers.

205. (NEW) The method of claim 136 wherein the second at least partial coating comprising the alignment transfer material has an average thickness ranging from 0.5 microns to 25 microns.

206. (NEW) The method of claim 136 wherein the second at least partial coating comprising the alignment transfer material has an average thickness ranging from 5 microns to 10 microns.

207. (NEW) The method of claim 136 wherein the second at least partial coating comprising the alignment transfer material further comprises at least one of a dichroic material, a photochromic material, a dye, an alignment promoter, a kinetic enhancing additive, a photoinitiator, a solvent, a light stabilizer, a heat stabilizer, a mold release agent, a rheology control agent, a leveling agent, a free radical scavenger, and an adhesion promoter.

208. (NEW) The method of claim 136 wherein the third at least partial coating comprising the at least one anisotropic material and the at least one dichroic material has an average thickness of at least 5 microns.

209. (NEW) The method of claim 136 wherein the at least one anisotropic material is at least one of a thermotropic liquid crystal polymer, a thermotropic liquid crystal pre-polymer, and a thermotropic liquid crystal monomer.

210. (NEW) The method of claim 136 wherein the at least one anisotropic material is a liquid crystal material having at least one functional group chosen from acrylates, methacrylates, allyl, allyl ethers, alkynes, amino, anhydrides, epoxides, hydroxides, isocyanates, blocked isocyanates, siloxanes, thiocyanates, thiols, urea, vinyl, and vinyl ethers.

211. (NEW) The method of claim 136 wherein the third at least partial coating comprising the at least one anisotropic material and the at least one dichroic material further comprises at least one of a photochromic material, a dye, an alignment promoter, a kinetic enhancing additive, a photoinitiator, a solvent, a light stabilizer, a heat stabilizer, a mold release agent, a rheology control agent, a leveling agent, a free radical scavenger, and an adhesion promoters

212. (NEW) The method of claim 136 further comprising forming an at least partial primer coating on the at least a portion of the at least one exterior surface of the ophthalmic element prior to forming the first at least partial coating comprising the alignment medium thereon.

213. (NEW) The method of claim 136 further comprising forming at least one additional at least partial coating chosen from photochromic coatings, anti-reflective coatings, transitional coatings, primer coatings, and protective coatings on at least a portion of the ophthalmic element.

214. (NEW) An ophthalmic element made according to claim 136.

215. (NEW) The method of claim 141 wherein imparting the at least one orientation facility on the at least a portion of the at least one exterior surface of the ophthalmic element comprises applying an at least partial coating comprising an alignment medium to the at least a portion of the at least one exterior surface of the ophthalmic element and at least partially ordering at least a portion of the alignment medium.

216. (NEW) The method of claim 215 wherein the alignment medium is at least one of a photo-orientation material, a rubbed-orientation material, and a liquid crystal material.

217. (NEW) The method of claim 215 wherein the alignment medium is a photo-orientation material and wherein at least partially ordering at least a portion of the alignment medium comprises exposing the portion to plane-polarized ultraviolet radiation.

218. (NEW) The method of claim 217 wherein the photo-orientation material is at least one of an azobenzene derivative, a cinnamic acid derivative, a coumarine derivative, a ferulic acid derivative, and a polyimide.

219. (NEW) The method of claim 215 wherein the alignment medium is a rubbed-orientation material and wherein at least partially ordering at least a portion of the alignment medium comprises rubbing the portion.

220. (NEW) The method of claim 219 wherein the rubbed-orientation material is at least one of a (poly)imide, a (poly)siloxane, a (poly)acrylate, and a (poly)coumarine.

221. (NEW) The method of claim 215 wherein the alignment medium is a thermotropic liquid crystal material and wherein at least partially ordering at least a portion of the alignment medium comprises exposing the thermotropic liquid crystal material to at least one of a magnetic field and an electric field.

222. (NEW) The method of claim 215 wherein forming the at least partial coating adapted to polarize at least transmitted radiation on at least a portion of the at least one orientation facility comprises:

applying an at least partial coating comprising at least one dichroic material and at least one anisotropic material to at least a portion of the at least partial coating comprising the alignment medium,  
at least partially aligning at least a portion of the at least one anisotropic material with at least a portion of the at least partially ordered portion of the alignment medium,  
at least partially aligning at least a portion of the at least one dichroic material with at least a portion of the at least partially aligned portion of the at least one anisotropic material, and  
at least partially setting at least a portion of the at least one anisotropic material.

223. (NEW) The method of claim 222 wherein the at least one dichroic material has an absorption ratio of at least 5.

224. (NEW) The method of claim 222 wherein the at least one dichroic material has an absorption ratio of at least 7.

225. (NEW) The method of claim 222 wherein the at least one dichroic material has an absorption ratio of at least 10.

226. (NEW) The method of claim 222 wherein the at least one dichroic material is at least one of an azomethine, an indigoid, a thioindigoid, a merocyanine, an indan, a quinophthalonic dye, a perylene, a phthaloperine, a triphenodioxazine, an indoloquinoline, an imidazo-triazine, a tetrazine, an azo, a (poly)azo dye, a benzoquinones, a naphthoquinones, an anthraquinone, a (poly)anthraquinone, an anthrapyrimidinones, iodine and an iodate.

227. (NEW) The method of claim 222 wherein the at least one dichroic material is a polymerizable dichroic material.



228. (NEW) The method of claim 222 wherein the at least one anisotropic material is at least one of a thermotropic liquid crystal polymer, a thermotropic liquid crystal pre-polymer, and a thermotropic liquid crystal monomer.

229. (NEW) The method of claim 222 wherein the anisotropic material is a liquid crystal material having at least one functional group chosen from acrylates, methacrylates, allyl, allyl ethers, alkynes, amino, anhydrides, epoxides, hydroxides, isocyanates, blocked isocyanates, siloxanes, thiocyanates, thiols, urea, vinyl, and vinyl ethers.

230. (NEW) The method of claim 215 wherein the alignment medium is a photo-orientation material and at least partially ordering at least a portion of the alignment medium comprises exposing at least a portion of the photo-orientation material to plane-polarized ultraviolet radiation; and wherein forming the at least partial coating adapted to polarize at least transmitted radiation on at least a portion of the orientation facility comprises:

- applying a mixture comprising at least one dichroic material and at least one thermotropic liquid crystal material to at least a portion of the at least partial coating comprising the photo-orientation material;
- at least partially aligning at least a portion of the at least one thermotropic liquid crystal material with at least a portion of the at least partially ordered portion of the photo-orientation material;
- at least partially aligning at least a portion of the at least one dichroic material with at least a portion of the at least partially aligned portion of the at least one thermotropic liquid crystal material; and
- at least partially setting at least a portion of the at least one thermotropic liquid crystal material.

231. (NEW) The method of claim 230 wherein the mixture comprising the at least one dichroic material and the at least one thermotropic liquid crystal material comprises at least two thermotropic liquid crystal materials.

232. (NEW) The method of claim 230 wherein the at least one thermotropic liquid crystal material is cross-linkable, and where setting at least a portion of the at least one thermotropic liquid crystal material comprises cross-linking the portion.

233. (NEW) The method of claim 232 wherein the at least one thermotropic liquid crystal material is photocross-linkable, and wherein cross-linking the portion of the at least one thermotropic liquid crystal material comprises exposing the portion to actinic radiation.

234. (NEW) The method of claim 141 further comprising applying an at least partial primer coating to the at least a portion of the at least one exterior surface of the ophthalmic element prior to imparting the at least one orientation facility thereon.

235. (NEW) The method of claim 141 further comprising applying at least one additional at least partial coating chosen from photochromic coatings, anti-reflective coatings, transitional coatings, primer coatings, and protective coatings to at least a portion of the ophthalmic element.

236. (NEW) An ophthalmic element made according to claim 141.

237. (NEW) The method of claim 164 wherein the alignment medium is a rubbed-orientation material.

238. (NEW) The method of claim 237 wherein the rubbed-orientation material is at least one of a (poly)imide, a (poly)siloxane, a (poly)acrylate, and a (poly)coumarine.

239. (NEW) The method of claim 164 further comprising applying an at least partial primer coating to the at least a portion of the at least one exterior surface of the ophthalmic element prior to applying the at least partial coating comprising an alignment medium thereon.

240. (NEW) The method of claim 164 further comprising applying at least one additional at least partial coating chosen from photochromic coatings, anti-reflective coatings, transitional coatings, primer coatings, and protective coatings to at least a portion of the ophthalmic element.

241. (NEW) The method of claim 175 wherein at least partially setting at least a portion of the at least one anisotropic material comprises at least partially cross-linking the portion by exposing the portion to ultraviolet radiation under an essentially inert atmosphere.

242. (NEW) An ophthalmic element made according to claim 164.

243. (NEW) A method of making an ophthalmic element comprising forming an at least partial coating adapted to polarize at least transmitted radiation on at least a portion of at least one exterior surface of the ophthalmic element, wherein forming the at least partial coating adapted to polarize at least transmitted radiation comprises:

- applying an at least partial coating comprising an alignment medium to the at least a portion of the at least one exterior surface of the ophthalmic element;
- at least partially ordering at least a portion of the alignment medium;
- applying an at least partial coating comprising at least one dichroic material and at least one anisotropic material to at least a portion of the at least partial coating comprising the alignment medium; and
- at least partially aligning at least a portion of the at least of the at least one dichroic material.

244. (NEW) The method of claim 243 wherein the alignment medium is at least one of a photo-orientation material, a rubbed orientation material, and a liquid crystal material.

245. (NEW) The method of claim 244 wherein the alignment medium is a photo-orientation material and wherein at least partially ordering at least a portion of the alignment medium comprises exposing the portion to plane-polarized ultraviolet radiation.

246. (NEW) The method of claim 245 wherein the photo-orientation material is at least one of an azobenzene derivative, a cinnamic acid derivative, a coumarine derivative, a ferulic acid derivative, and a polyimide.

247. (NEW) The method of claim 244 wherein the alignment medium is a rubbed-orientation material and wherein at least partially ordering at least a portion of the alignment medium comprises rubbing the portion.

248. (NEW) The method of claim 244 wherein the alignment medium is a thermotropic liquid crystal material and wherein at least partially ordering at least a portion of the alignment medium comprises exposing the thermotropic liquid crystal material to at least one of a magnetic field and an electric field.

249. (NEW) The method of claim 243 wherein applying the at least partial coating comprising the at least one dichroic material and the at least one anisotropic material to the at least a portion of the at least partial coating comprising the alignment medium comprises applying a mixture comprising the at least one dichroic material and the at least one anisotropic material to the at least a portion of the at least partial coating comprising the alignment medium.

250. (NEW) The method of claim 243 wherein the at least partial coating comprising the at least one dichroic material and the at least one anisotropic material comprises further comprises at least one of a photochromic material, a dye, an alignment promoter, a kinetic enhancing additive, a photoinitiator, a solvent, a light stabilizer, a heat stabilizer, a mold release agent, a rheology control agent, a leveling agent, a free radical scavenger, and an adhesion promoter.

251. (NEW) The method of claim 243 wherein the at least one dichroic material is at least one of an azomethine, an indigoid, a thioindigoid, a merocyanine, an indan, a quinophthalonic dye, a perylene, a phthaloperine, a triphenodioxazine, an indoloquinoline, an imidazo-triazine, a tetrazine, an azo dye, a (poly)azo dye, a benzoquinone, a naphthoquinone, an anthraquinone, a (poly)anthraquinone, an anthrapyrimidinone, iodine, and an iodate.

252. (NEW) The method of claim 243 wherein the at least one anisotropic material is a thermotropic liquid crystal material.

253. (NEW) The method of claim 243 wherein the at least one anisotropic material is a liquid crystal material having at least one functional group chosen from acrylates, methacrylates, allyl, allyl ethers, alkynes, amino, anhydrides, epoxides, hydroxides, isocyanates, blocked isocyanates, siloxanes, thiocyanates, thiols, urea, vinyl, and vinyl ethers.

254. (NEW) The method of claim 243 wherein at least partially aligning at least a portion of the at least one dichroic material comprises at least partially aligning at least a portion of the at least one anisotropic material with at least a portion of the at least partially ordered portion of the alignment medium and at least partially aligning the at least a portion of the dichroic material with at least a portion of the at least partially aligned portion of the at least one anisotropic material.

255. (NEW) The method of claim 254 further comprising setting at least a portion of the at least one anisotropic material after at least partially aligning at least a portion of the at least one anisotropic material.

256. (NEW) The method of claim 255 wherein the at least one anisotropic material is a cross-linkable liquid crystal material, and wherein setting at least a portion of the at least one anisotropic material comprises cross-linking at least a portion of the cross-linkable liquid crystal material.

257. (NEW) The method of claim 256 wherein the liquid crystal material is photocross-linkable, and wherein the cross-linking at least a portion of the cross-linkable liquid crystal material comprises exposing at least a portion of the cross-linkable liquid crystal material to actinic radiation.

258. (NEW) The method of claim 243 wherein:

- applying the at least partial coating comprising the alignment medium to the at least a portion of the at least one exterior surface of the ophthalmic element comprises applying an at least partial coating comprising a photo-orientation material to the at least a portion of the at least one exterior surface of the ophthalmic element;
- at least partially ordering at least a portion of the alignment medium comprises exposing at least a portion of the photo-orientation material to plane-polarized ultraviolet radiation;
- applying the at least partial coating comprising the at least one dichroic material and at least one anisotropic material to the at least a portion of the at least partial coating comprising the alignment medium comprises applying a mixture of at least one dichroic material and at least one thermotropic liquid crystal material to

at least a portion of the at least partial coating comprising the photo-orientation material; and  
at least partially aligning at least a portion of the at least one dichroic material comprises:  
    at least partially aligning at least a portion of the at least one thermotropic liquid crystal material with at least a portion of the at least partially ordered portion of the photo-orientation material;  
    at least partially aligning at least a portion of the at least one dichroic material with at least a portion of the at least partially aligned portion of the at least one thermotropic liquid crystal material; and  
    at least partially setting at least a portion of the at least one thermotropic liquid crystal material.

259. (NEW) The method of claim 258 wherein the mixture of the at least one dichroic material and the at least one thermotropic liquid crystal material comprises at least two thermotropic liquid crystal materials.

260. (NEW) The method of claim 258 wherein the at least one thermotropic liquid crystal material is cross-linkable, and where setting at least a portion of the at least one thermotropic liquid crystal material comprises cross-linking at least a portion of the at least one thermotropic liquid crystal material.

261. (NEW) The method of claim 260 wherein the at least one thermotropic liquid crystal material is photocross-linkable, and wherein cross-linking at least a portion of the at least one thermotropic liquid crystal material comprises exposing at least a portion of the at least one thermotropic liquid crystal material to actinic radiation.

262. (NEW) The method of claim 243 wherein the at least partial coating comprising the alignment medium further comprises at least one of a photochromic material, a dye, an alignment promoter, a kinetic enhancing additive, a photoinitiator, a solvent, a light stabilizer, a heat stabilizer, a mold release agent, a rheology control agent, a leveling agent, a free radical scavenger, and an adhesion promoter.

263. (NEW) The method of claim 243 wherein the at least partial coating comprising the anisotropic material and the at least one dichroic material further comprises at least one of a photochromic material, a dye, an alignment promoter, a kinetic enhancing additive, a photoinitiator, a solvent, a light stabilizer, a heat stabilizer, a mold release agent, a rheology control agent, a leveling agent, a free radical scavenger, and an adhesion promoter.

264. (NEW) The method of claim 243 further comprising forming an at least partial primer coating on the at least a portion of the at least one exterior surface of the ophthalmic element prior to forming the at least partial coating comprising the alignment medium thereon.

265. (NEW) The method of claim 243 further comprising forming at least one additional at least partial coating chosen from photochromic coatings, anti-reflective coatings, transitional coatings, primer coatings, and protective coatings on at least a portion of the ophthalmic element.

266. (NEW) An ophthalmic element made according to claim 243.

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